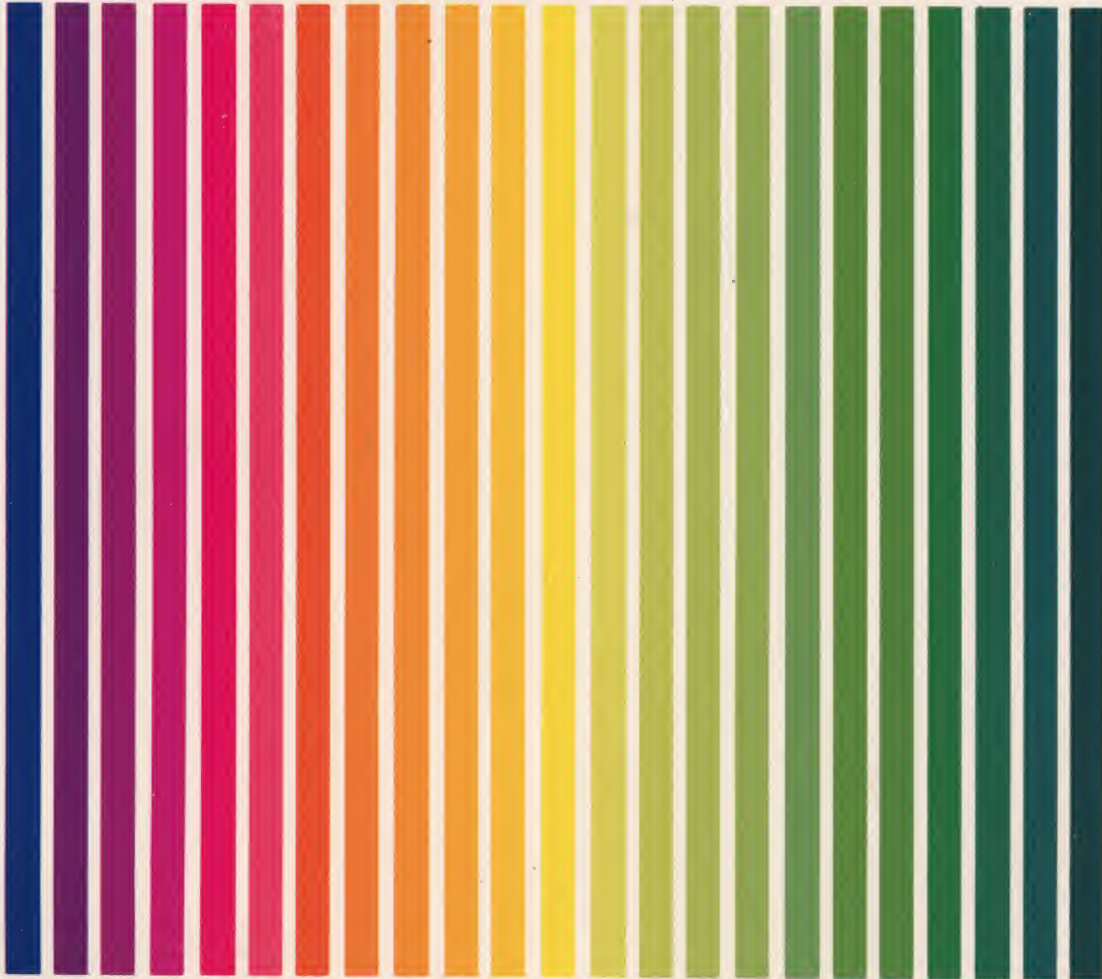# CPX
ATARI® PROGRAM EXCHANGE

Jose R. Suarez

CODECRACKER

APX-10052 APX-20052

User-Written Software for ATARI Home Computers

Jose R. Suarez

CODECRACKER

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CODECRACKER

by

Jose R. Suarez

INSTRUCTIONS
9/1/81

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OVERVIEW

CODECRACKER is a one- or two-player game of logic. It demands strategy and concentration. Your opponent, or the computer for a one-player game, secretly selects a code of digits. Using the keyboard, you make as many as twelve guesses in attempting to crack the code. The computer gives you clues: a light green "I" displays for each correct digit in the correct position of the code; a red "O" displays for each correct digit in an incorrect position. Of course, it's up to you to figure out which digits these clues apply to. Your goal is to decipher the code in the least number of guesses. Play with or without varying degrees of time pressure. Try to beat your previous score or that of your opponent. The lower your score, the better CodeCracker you are!

REQUIRED ACCESSORIES

    Cassette version
        8K RAM
        ATARI 410 Program Recorder
    Diskette version
        16K RAM
        ATARI 810 Disk Drive
    ATARI BASIC Language Cartridge

CONTACTING THE AUTHOR

Users wishing to contact the author about CODECRACKER may write to him at:

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GETTING STARTED

LOADING CODECRACKER INTO COMPUTER MEMORY

1. Insert the ATARI BASIC Language Cartridge in the (Left Cartridge) slot of your computer.

2. If your ATARI 850 Interface Module is turned on, turn it off (to save on computer memory).

3. If you have the cassette version of CODECRACKER:

   a. Turn on your TV set.

   b. Turn on your computer and connect your program recorder to the computer and to a wall outlet.

   c. Slide the CODECRACKER cassette in the program recorder's cassette holder and press REWIND on the recorder until the tape rewinds completely. Then press PLAY.

   d. Type CLOAD on your computer and then press the RETURN key two times. The tape will load into computer memory.

   e. After the tape finishes loading, the word READY will display on your TV screen. Type RUN and press the RETURN key. The first display screen of CODECRACKER, as described later, will appear on your TV screen.

   If you have the diskette version of CODECRACKER:

   a. Turn on your disk drive.

   b. When the BUSY light goes out, open the disk drive door and insert the CODECRACKER diskette with the label in the lower right-hand corner nearest to you.

   c. Turn on your computer and TV set.

   d. When the READY prompt displays on your TV screen, type RUN "D:CODE" and press the RETURN key. If you're using more than one disk drive, remember to follow the device initial (D) with the number of the drive containing the CODECRACKER diskette (e.g., RUN "D2:CODE" for disk drive two). The program will load into computer memory and start.

THE FIRST DISPLAY SCREEN

The first display screen looks as follows.

```
------------------------------------------
|                                        |
|        C O D E C R A C K E R           |
|                                        |
|                                        |
| CODE LENGTH?                           |
|                                        |
|                                        |
|                                        |
|                                        |
|                                        |
|                                        |
|    ---------------------------------   |
|    | (3-5 DIGITS)                  |   |
|    |                              |   |
|    ---------------------------------   |
|                                        |
------------------------------------------
```

You're now ready to select your three game options: code length, time factor, and number of players.

NOTE ON ENTERING INFORMATION

Throughout CODECRACKER, from selecting game options to typing in code guesses, the text window at the bottom of the display screen indicates your available choices. In all cases except one, you enter only the information; pressing the RETURN key isn't necessary. (The one exception is typing in players' names for two-player games, since name lengths vary.)

If your choice consists of typing digits (for example, in response to the message "ENTER DIGIT #1"), then type in a digit within the specified range, if any. If a choice consists of a word reply (for example, in response to the message "IS THIS YOUR GUESS? -Yes, -Erase, -Change"), then type in the first letter of the reply (for example, type in "Y" for "Yes"). Sometimes your choices consist of both digits and words (for example, in response to the message "WHICH DIGIT POSITION? (1-3/None)"). In these cases, type in either an appropriate digit or the first letter of the displayed word.

SELECTING GAME OPTIONS

Code Length

Choose a code length between three and five digits. The shorter the code, the easier your job is to crack it.

After you type in your desired code length, your choice will display next to the CODE LENGTH? prompt, and the text window then displays the choices for the next game option.

Time Factor

The display screen now contains this second prompt:

TIME FACTOR?

and the text window displays your choices:

```
----------
| (1-9/None)  |
----------
```

First, decide whether to play under the pressure of a set amount of time for each turn or whether to play with unlimited time. If you choose unlimited time, enter an "N" in response to this prompt.

If you want to play with a time factor, decide how much pressure you want to play under. The greater the digit you select (between 1 and 9), the longer you have to make a guess, but unused time in one turn doesn't accrue to later turns. To calculate the time in minutes, multiply your chosen code length times your time factor digit and divide by two. For example, if you choose a code length of 4 digits and a time factor of 3, then you have six minutes ((4x3)/2) per turn. If you choose a length of 4 digits and a time factor of 6, then you have twelve minutes per turn. See the SCORING section for a table listing all the alloted times. Whenever you exceed your time in a turn, you're penalized. The SCORING section has more information about time penalties.

After you enter your time factor digit, it displays next to the TIME FACTOR? prompt and the text window displays the choices for the third game option.

Number of players

The display screen now contains this third prompt:

NUMBER OF PLAYERS?

and the text window displays the available choices:

```
 _____
|(1-2)       |
 _____
```

If you play alone, the computer supplies the secret codes for you to crack. To play
alone, type a "1". The game screen, described below, will then display.

If you play against an opponent, you create the codes for your opponent and your opponent
creates the codes for you. To play against an opponent, type a "2". The following message
will then display:

        PLAYER 1,
        ENTER YOUR NAME

and the text window will display the prompt:

```
 _____
|UP TO 7 LETTERS? |
 _____
```

Enter the name of the first player--it can be as long as seven letters--and then press
the RETURN key. The message then changes to:

        PLAYER 2,
        ENTER YOUR NAME

Enter the name of the second player in the same way and press the RETURN key.

You've now chosen all three game options and are ready to crack your first code!

PLAYING CODECRACKER

ONE-PLAYER GAME

Shortly after selecting a one-player game by typing "1" in response to the NUMBER OF
PLAYERS? prompt, the screen clears and the word "BEGIN" displays briefly. Then the
playing screen displays and you're ready to enter your first guess. The screen looks like
this:

```
 -------------------------------------
|                                     |
|   1.                                |
|                                     |
|                                     |
|                                     |
|                                     |
|                                     |
|                                     |
|    --------------------------       |
|   | ENTER DIGIT #1        |   |     |
|   |                       |   |     |
|    --------------------------       |
|                                     |
 -------------------------------------
```

Enter your guess for the first digit of the code. The text window prompt then changes to
a request for the next digit, until you enter as many digits as you specified in the CODE
LENGTH option. Each digit automatically appears in its proper position as you press the
digit keys. After you type in the final digit, a row of asterisks appears to the right of
your guess, and line 1 looks something like this:

        1. 469   ***

The blue text window then contains this message:

```
 -----------------------------------
|IS THIS YOUR GUESS?  -Yes          |
|                     -Erase        |
|                     -Change       |
 -----------------------------------
```

If you're satisfied with your guess, press the "Y" key (for "Yes"). CODECRACKER will then
evaluate your guess and display clues, as explained below.

If you want to start your turn over again, press the "E" key (for "Erase"), and
CODECRACKER will erase your digits and prompt you to enter digit #1 again.

If you want to change only one or some of the digits, press the "C" key (for "Change").
CODECRACKER then places a blue pointer under each digit in the display and the message in

-6-

the text window changes to:

```
-------------------------------------
| WHICH DIGIT POSITION? (1-n/None) | ,
-------------------------------------
```

where "n" represents the CODE LENGTH you specified as an option. Type in the numeric position of the digit you want to change. For example, if your current guess is:

```
1.    469    xxx
      ^^^
```

and you want to change the 9 to an 8, then type in 3, for digit #3. The third digit is then erased, the third pointer changes to yellow, and the text window shows this prompt:

```
-------------------------
|ENTER NEW DIGIT    |
-------------------------
```

Now you enter your new choice for this position (8, in our example). This changing routine continues, letting you change as many digits as you like, until you type an "N", for "None". Then the earlier prompt, "IS THIS YOUR GUESS?" displays in the text window and you can tell CODECRACKER to evaluate your guess (by typing "Y" for "Yes").

You continue to type in guesses in this way until you decipher the code or you use up all twelve turns.

When you crack a code, you receive a congratulatory message and a rating. The text window contains the prompt for playing another round:

```
-------------------------------------
|TO PLAY AGAIN PRESS START       |
-------------------------------------
```

When you press the START key, the game options screen redisplays so you can pick new options, if you want to.

TWO-PLAYER GAME

If you choose a two-player game, one player first needs to enter the secret code before play begins. CODECRACKER's messages guide you through this process. Using the names of the two players you typed in, and the code length you specified, CODECRACKER displays the following message (names are represented by "XXXX", who is player 1, and "YYYY", who is player 2; code length is represented by "n"):

```
        XXXX, LEAVE
        THE ROOM

        YYYY, ENTER
        A n-DIGIT CODE:


           - - -


        _____
        |ENTER DIGIT #1          |
        _____
```

In response to the prompt in the text window, YYYY types in one digit at a time. Then the text window displays this verification prompt:

```
        _____
        |SATISFACTORY? (Yes/No)  |
        _____
```

If YYYY likes the code as displayed, he or she types "Y" for "Yes". If YYYY wants to change the code, he types "N" for "No", and CODECRACKER reprompts for entering the code. After YYYY is satisfied with the code and types "Y", CODECRACKER informs him that he can now call XXXX back and start the game:

```
        YYYY, YOU MAY
        CALL XXXX BACK

        XXXX WILL NOW
        ATTEMPT TO DECIPHER
        THE CODE

        XXXX, ARE YOU
        READY?


        _____
        |PRESS SPACE BAR TO CONTINUE     |
        _____
```

Once player one presses the SPACE BAR, a "BEGIN" message displays briefly. Then the playing screen displays and you're ready to enter your first guess. See the description under ONE-PLAYER GAME for further information on making your guesses.

After player one deciphers the code or uses all twelve turns, CODECRACKER displays player one's score and comments that it's player two's turn. The same messages will display this time for player two to leave the room while player one enters a secret code, and play then resumes.

After each round, CODECRACKER asks whether you want to play some more:

```
            DO YOU WANT TO STOP
            HERE OR CONTINUE?


        ---------------------------------
        |(Stop/Continue)                 |
        ---------------------------------
```

Type "S" to stop. CODECRACKER then displays your final scores and announces the winner. It also gives you a chance to start all over. An example of this display is as follows:

```
            XXXX'S SCORE: 5
            YYYY'S SCORE: 5

            IT'S A DRAW


        ------------------------------------
        |TO PLAY AGAIN PRESS START          |
        ------------------------------------
```

If you press the START key, you'll begin again at the game options screen.

To continue playing additional rounds using the same game options, type "C". CODECRACKER then displays the messages telling one player to enter a secret code for the other player, and play resumes.

CODECRACKER STRATEGY

CODECRACKER supplies two kinds of clues in response to each guess you type in. One is a green "I", indicating one digit in your guess is both correct and in the right position. The other is a red "O", indicating that one digit in your guess is correct, but is out of position. For example, if the secret code were 37084 and you guess 47491, CODECRACKER would respond:

            1. 47491 ____ IO

The "I" means you guessed one digit correctly and in the right position (in this case, the 7), and the "O" means you guessed one digit correctly, but in the wrong position (in this case, one of the 4's). (Note that only one 4 is considered correct, not both. Thus, if your guess were 92544, CODECRACKER would display a green "I" for the 4 in the fifth position, but nothing for the 4 in the fourth position.) Of course, even though CODECRACKER provides these clues, it doesn't tell you which digits they apply to; that's your job to figure out.

You must use the cumulative information provided by these clues. Your first guess is as valuable during your seventh move as it was during your second move. Make your current guess "work" in every previous situation. Here's an example for a four-digit code:

GUESS #1:   5279 ___ OO
             Two digits are correct, but in the wrong place.
             Therefore, two of these digits, and only two, must
             appear in every following guess, but in different
             positions.

GUESS #2:   7896 ___ II
             Two digits are correct and in the right position.
             Thus, two, and only two, of these digits must appear
             in every following guess in the same position. At
             the same time, the following guesses must contain
             two digits from guess #1, but in different positions.

GUESS #3:   2893 ___ IOO
             One digit is now correct and in the right place; two
             digits are correct, but in the wrong place. Every
             following guess must have one of these digits in the
             same position, two in different positions, two
             from guess #2 in the same positions, and two from
             guess #1 in different positions. Continue adding
             to your bank of information until you narrow down
             the possibilities to only one workable combination.

If you follow this procedure, you should be able to break codes in six to eight turns
just about every time. Practice at the three-digit level until you become skilled at this
technique.

SCORING

Your goal is to earn the lowest score possible. Your score consists of the total number
of turns you take during a game. However, two kinds of penalties will increase your
score: (1) in a two-player game, a penalty for not deciphering the code and (2) in a game
with a time factor, a penalty for taking too long to guess.

Penalty for not cracking the code

When you fail to decipher the code in twelve turns, 5 is added to your score.

Penalty for taking too long to guess

Whenever you take longer than the specified time limit to complete a guess, you lose one
or more turns. As stated earlier, the time factor you select as a game option determines
your time limit per turn. The following table shows allowable time limits.

TABLE OF ALLOTTED TIMES
(in minutes)

Code length

		3	4	5
T				
i	1	1.5	2	2.5
m	2	3	4	5
e	3	4.5	6	7.5
	4	6	8	10
f	5	7.5	10	12.5
a	6	9	12	15
c	7	10.5	14	17.5
t	8	12	16	20
o	9	13.5	18	22.5
r				

Each time you exceed a <u>multiple</u> of your limit, you lose one turn. For example, suppose your time limit is 4 minutes. If you exceed 4 minutes to complete your guess, you lose one turn. If you exceed 8 minutes (twice your limit) to complete your guess, you lose two turns. If you exceed 12 minutes, you lose three turns, and so on. CODECRACKER calculates the penalty after you complete your current move. It sounds a buzzer and displays the message

        TOO MUCH TIME: x MIN. y SEC.

where "x" and "y" are numbers. Watch your last turn number; it changes to its new value. Should your new turn number exceed 12 (the limit), then CODECRACKER won't consider your guess, even if it's correct. It thinks you took your twelve guesses and failed to crack the code. A blue "P" appears at the right-hand side of your TV screen to remind you of the penalty.

ENDING A ROUND PREMATURELY

To end a game before it comes to a natural halt, press the BREAK key. By typing RUN and pressing the RETURN key, you can start over again, choosing new game options. (Note to ATARI 400 computer owners with 8K of RAM. Do <u>not</u> press the SYSTEM RESET key. If you do, the system will crash.) After leaving the program, type in a direct mode CLR command before returning to graphics mode 0.

PROBLEMS

DOUBLE CHARACTERS

The micromotion keyboard panel on the ATARI 400 computer sometimes sends double
characters, especially upon hesitant keystrokes. This may cause the input routine to
refuse input from the same key twice in a row. Should you have this problem, press an
irrelevant key (e.g., CLR-SET-TAB or Z or Q) to clear the character.

GAME SUMMARY

1. Choose the CODE LENGTH (3-5 digits), TIME FACTOR (1-9/None), and NUMBER OF PLAYERS (1 or 2).

2. In a two-player game, players enter their names and follow CODECRACKER's instructions for creating a secret code.

3. Enter a guess. After you complete your guess, your choices are (type in the underlined letter): (1) Yes, this is my guess; (2) Erase my guess and let me start over; and (3) Change my guess one digit at a time. Under the Change choice, you (a) enter the numeric position of the digit you want to change, and (b) enter the new digit.

4. You have twelve turns to decipher the code. You lose one or more turns if you exceed your time limit (if you choose a time limit). If a two-player game, 5 is added to your score if you fail to decipher a code.

PROGRAM COMMENTS (numbers are line numbers)

1. Except for TURN, all variables initialized here have fixed values, and therefore are <u>constants</u>. Their only purpose is to save memory (lots of it). Remember their values:

X=1	B=10
D=2	E=12
F=4	C=60
V=5	Y=0(Initialized by BASIC)
S=6	KEY=6010 (Routine to input a digit or command)
W=7	

The OPEN command allows direct input from the keyboard.

2. The PEEK'S get the beginning of the display list. The POKE'S use this information to modify the list. The first POKE sets the second line on the graphics-1 screen to graphics 2 (for the title). The second POKE compensates for this by shrinking a blank display block to one scan line. This is a lot easier (and cheaper, memory-wise) than rewriting the whole display list.

3. CODE holds the secret code; GUESS holds your guesses; FLAG1 is used in the clue-giving logic;PL1$ and PL2$ hold the players' names. By default, your name is "ACE" (1-player game-change this to your name!)

5. The first POKE sets the left margin in the blue window (in case your default setting is different from mine). The second POKE suppresses the cursor.

6. The first use of the direct-entry subroutine, explained later.

9. When you choose no time factor, its value is set so high that it literally ceases to be a factor (1 x 10^{97} is too high for the frame counter to go).

12. The beginning of the 2-player game loop. J determines the row to be manipulated by your commands; M is the move number (which may be incremented independently of J); K's value determines if you have deciphered the code.

30. Random-number-generating routine for the 1-player game. Note the nested random-delay loop. This seems to insure a "more random" code-without it, repeats seem to occur too often, and sometimes patterns are discernable.

42. Beginning of the guess loop. All used elements of FLAG1 must be set to 0 every move.

45. Sub 5500 right-adjusts the move number in the display. It is a subroutine because it is also used by the time-penalty sub-routine (explained later). The three POKES (location 18, 19, and 20) set the hardware timer (TV-frame counter) down to zero-your move is being timed!

50-
80 Here you enter your guess.

107 Once you finally accept your guess, the computer calculates
the time you took (sub 8000) and checks to see if you exceeded
your chosen limit (sub 5000).

110- The computer finds all the guess digits in the right place
130 and gives you appropriate clues. The FLAG1 element and the
GUESS element are flagged to prevent that code digit and that
guess digit from being used again (they're already accounted for).

140 If there are as many digits in the right place as there are
in your selected code size, then you have found the code.

150- This loop finds the digits in the wrong place and gives you
180 your clues. The code and your guess are again flagged when
correct digits are found.

190 Marks the end of the main loop. The counting variables are
incremented and the computer goes back to start another line.

235 Sub 7000 gives you your rating; sub 3000 adds some life to
the program.

300- These lines are only used in the 2-player game(except to make
1060 the initial selection of 1 or 2 players). Thus, they are
labelled a subroutine.

300 If players are already selected and named, then skip over
this section.

340- Players' names are given to the computer. The POKE at line
380 350 is just for neatness in case you hit RETURN accidentally
before entering your name. (It brings the cursor back where it
started.)

810- Here, a player enters the code to be deciphered by his
890 opponent. You are given a chance to change the code if you
don't like it.

1090-The current player's score is calculated and displayed.
1120 TURN determines whose turn it is. (It alterntes in value
between 1 and -1 - see next statement).

1130 This statement prevents a lot of code repetition. To start
another turn, simply swap the names of the players, and use the
same section of code again.

1260 The end of the 2-player loop.

1400-Displays the final scores and calls the winner. The display
1440 list is again modified for emphasis.

2020 Erases an unsatisfactory guess, and lets you enter another one.

2045-Routine to change digits at will in your prospective guess.
2100

4000-Waits until you press START button to begin a new game.
4040 The POKE at 4010 sets the attract-mode calender to 0 (stops
flashing colors), since the START key does not do this on its own.

The SETCOLOR command runs color register 3 through fifteen colors
in a 2-player game. The word "WINS" uses register 3-need I say more?

5000 If you have exceeded your time limit then you will be assessed
a penalty.

5020 The number of moves you lose is determined by the formula
here, where CLOK is the time in seconds, IMAX is the length of the
code, and T is the time factor. In simpler terms, the increment to M
is the integer portion of the time taken over the time allowed.
The POP prevents problems caused by the abnormal return from the
subroutine (pops subroutine address off the stack) in case your
new move number is greater than 12 (the limit).

5030 Calls sub 5500 to print your new move number over the old
one.

5500- Right-adjusts move number.
5510

6010- Direct input from the keyboard (ATASCII code numbers) is
6030   converted to characters by the CHR$ function, and-where
applicable-to digits by the VALue function. If the character is non-
numeric, then N is flagged with a -1. This makes testing for
inappropriate input extremely easy. This routine is designed to
compensate for inverse-video, and lower-case characters (should
you enter these modes accidentally).

6500- The winning fanfare (3-part harmony).
6520

6600- The losing noise.
6610

7000- Gives your performance a rating.
7020

8000- Here, the current time in the registers (location 18,19,and20)
8010   is read and converted to a decimal ($LSB \times 256^2 + NSB \times 256^1 + MSB \times 256^0$).
The result is in 60ths of a second. Then the time is converted
to seconds. Finally, the minutes and seconds (less than 60) are
calculated and stored.
Note: Recall that these registers were set to 0 at the beginning
      of your move. Therefore, the time here is the actual amount
      of time taken to arrive at one guess.

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1. Name and APX number of program _____

2. If you have problems using the program, please describe them here.

_____

_____

_____

3. What do you especially like about this program?

_____

_____

_____

4. What do you think the program's weaknesses are?

_____

_____

_____

5. How can the catalog description be more accurate and/or comprehensive?

_____

_____

6. On a scale of 1 to 10, 1 being "poor" and 10 being "excellent", please rate the following aspects of this program?

_____ Easy to use
_____ User-oriented (e.g., menus, prompts, clear language)
_____ Enjoyable
_____ Self-instructuve
_____ Useful (non-game software)
_____ Imaginative graphics and sound

7. Describe any technical errors you found in the user instructions (please give page numbers).

_____

_____

_____

8. What did you especially like about the user instructions?

_____

_____

_____

9. What revisions or additions would improve these instructions?

_____

_____

_____

10. On a scale of 1 to 10, 1 representing "poor" and 10 representing "excellent", how would you rate the user instructions and why?

_____

_____

11. Other comments about the software or user instructions:

_____

_____

_____

_____   -----
                                                  | |
_____ |STAMP|
                                                  | |
_____   -----

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